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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,154	01/27/2005	Stefano Olivieri	IT 020022	8389

24737 7590 07/31/2009
PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
VLAHOS, SOPHIA	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
07/31/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/523,154	Applicant(s) OLIVIERI, STEFANO	
	Examiner SOPHIA VLAHOS	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The amendments to the claims (6/04/2009) have overcome the 35 U.S.C 101 rejection of claim 4, the 35 U.S.C. 112 first paragraph rejection of claims 1-7, and the 35 U.S.C. 112 second paragraph rejection of claims 6-7.

Applicant's arguments (6/04/2009) with respect to the 35 U.S.C 103(a) rejection of claims 1, 4, 6-7 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. aims 1, 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (U.S. 7,072,413) in view of Tong et al. (U.S. 6,744,744) and Dötsch et al. (U.S. 6,513,140).

With respect to claim 1, Walton et al., disclose: an encoder for encoding information according to an error protecting code (Fig. 4A, encoder block 412, column 20, lines 21-31, where a turbo code, a convolutional code, a concatenated code are error protecting codes); a modulator for modulating information from the encoder in a transmission signal (Fig. 4A, blocks 418, 420, 4242, 322A, 322T and transmitting

antennas 324A through 324T, column 19, lines 55-56, column 21, lines 15-34); a control unit for dynamically selecting a coding rate that is to be used by the encoder, the coding rate being dependent on a level of protection against errors (Fig. 3 controller 334 generates the coding control signal shown in Fig. 4A, column 19, lines 7-9 and column 20, lines 45-56, for example if QPSK modulation is used two coding rates for 2 SNR regions are available as shown in table 1 on column 21. Rate ½ outputs 2 units of information out of which 1 is non-redundant and 1 is redundant whereas rate 3/4 outputs 4 units of information out of which 3 are non-redundant and 1 is redundant. (The rate ½ provides a higher level of protection)) wherein the encoder comprises: an input for receiving information bits (see Fig. 4A, see supplied information bits to encoder 412) an interleaver and puncturing unit that interleaves at a first variable rate symbols with a predetermined interleaving scheme for protection against burst errors in the transmission signal, the interleaving and puncturing unit puncturing the interleaved symbols at a second variable rate subsequent to said interleaving, puncturing being controlled dynamically by the selected coding rate (Fig. 4A, interleaving block 414 and puncturing block 416, column 19, lines 56-63 column 20, lines 21-31, interleaving is described in column 18, lines 64-67, through column 19, lines 1-2 and it is well known in the art that the re-ordering (or shuffling) protects the transmission against burst errors affecting portions of a transmitted signal);

Walton et al. do not expressly disclose: the encoder comprising: an input for receiving information symbols; a parity symbol generator for generating parity symbols from the information symbols; and an interleaving and puncturing unit that interleaves at

a first variable rate the information signals and parity symbols with a predetermined interleaving scheme for protection against burst errors in the transmission signal; the interleaving and puncturing unit puncturing the interleaved parity symbols at a second variable rate subsequent to said interleaving.

In the same field of endeavor (transmitter with variable interleaving and puncturing) Tong et al. discloses: an encoder comprising: a parity bit generator for generating parity bits from the information bits (Fig. 5, see output of either encoder 1 P1 and/or encoder 2, P2, column 10, lines 23-28); and an interleaving and puncturing unit (Fig. 5, channel interleavers and puncture block (also show in Fig. 3)) that interleaves at a first variable rate (column 4, lines 38-61, and example on column 8, lines 23-65, the interleaving rate depends on the number of Nr, Nc ,γ) the information bits and parity bits with a predetermined interleaving scheme for protection against burst errors in the transmission signal (column 10, lines 32-39, column 1, lines 53-55, where the interleaving protects against burst errors since it shuffles bits so that no single codeword is affected by burst noise and the receiver cannot decode it), the interleaving and puncturing unit puncturing the interleaved parity symbols at a second variable rate subsequent to said interleaving,(see "P/R" control signal in rate matcher 26 as shown in Fig. 3, and Fig. 5, see column 3, lines 45-46, column 5, lines 14-26, column 10, lines 44-55).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Walton et al. based on Tong et al. so that turbo encoding is used (Tong et al.. see increasing attention being given to the use of turbo

coding in wireless communications systems column 1, lines 19-25, column 10, lines 4-14, and Walton et al. column 20, lines 22-27).

In the same field of endeavor (RF communications), Dötsch et al. disclose: symbols (Fig. 1 turbo encoder , input U comprises uuencoded symbols and R1 and R2 are redundancy symbols see Fig. 2 and column 6, lines 18-67, through column 7, lines 19);

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Walton et al. and Tong et al. based on the teachings of Dötsch et al so that turbo encoding is performed on symbols (groups of bits).

With respect to claim 3, the system obtained by modifying Walton et al. based on Tong et al., and Dötsch et al. further comprises: wherein the parity symbol generator comprises a first convolution encoder (see Fig. 5, "encoder 1" block 92, see column 10, lines 23- 27) and a pre-encoding interleaver coupled to the input (Fig. 5, "interleaver" block 91) and a second convolution encoder cascaded after the pre-encoding interleaver (Fig. 5, "encoder 2" cascaded behind block 91), the interleaving and puncturing unit comprising a first post encoding interleaver, coupled to interleave the information symbols and an output of the first convolution encoder (Fig. 5, circuit portion comprising channel interleavers 93 for S and P1 corresponds to the claimed first post encoding interleaver), and a second post-encoding interleaver coupled to interleave an

output of the second convolution encoder (Fig. 5, block 93 interleaver of P2), separate from the first post encoding interleaver.

Method claim 4 is rejected based on a rationale similar to the one used to reject claim apparatus 1 above.

4 Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (U.S. 7,072,413) in view of Tong et al. (U.S. 6,744,744) and Dötsch et al. (U.S. 6,513,140) as applied to claims 1 & 4 above, and further in view of Farrell et al. (U.S. 6,643,331).

With respect to claim 2, the system obtained by modifying Walton et al. based on Tong et al., and Dötsch et al. further comprises: wherein the interleaving and puncturing unit comprises an interleaving memory (Fig. 3 see working memory 50), the parity symbol generator outputting the parity symbols into a first port of the interleaving memory (Fig. 3, see input to memory 50, linear addressed write-in column 6, lines 15-17, column 10, lines 31-35 where the channel interleavers (for the P1, P2 parity symbols, where a memory is understood to have an input (a first port) where information is supplied to for storage) function as the one shown in detail in Fig. 3); a subset of the generated and stored parity symbols being mapped to the modulation symbols (Fig. 3 of Tong et al. shows interleaving followed by puncturing (of interleaved data in the FIFO memory 65) since puncturing deletes data (symbols(the punctured output 76 supplied

to a modulator only includes a subset of the generated and stored data (of working memory 50)) a size of the subset being controlled dynamically by the selected coding rate (Fig. 3, "P/R" control signal supplied to selector 66 determines whether puncturing takes place dynamically in response to channel quality measure as taught by Zhang).

Neither Walton et al., nor Tong et al. or Dötsch et al. expressly teach: the modulator mapping the parity symbols to positions in modulation symbols according to the locations at which the parity symbols have been written into memory; reading and mapping being coordinated to result in interleaving of at least the parity symbols so that parity symbols and information symbols, normally associated with the same modulation symbol, are distributed over mutually separated modulation symbols; the subset being defined by selecting the locations that are mapped to positions in the modulation symbols.

In the same field of endeavor, Farrell et al. disclose: the modulator mapping the parity symbols to positions in modulation symbols (Fig. 3 through Fig 5 showing turbo encoder, its associated buffer and the mapping to modulation (constellation) symbols, see column 3, lines 1-65).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Walton et al, Tong et al. and Dötsch et al. based on the teachings of Farrell et al., so that the modulator maps the parity symbols to positions in modulation symbols according to the locations at which the parity symbols have been written into memory the rationale being the modulation symbols comprise parity symbols (and information symbols as taught by Farrell). The symbol mapping is

therefore clearly dependent on the initial supplying and writing of the symbols in the memory and the reading (that creates the interleaved symbols) as taught by Tong et al., as part of the process of mapping interleaved symbols into modulation symbols.

With respect to the limitations, reading and mapping being coordinated to result in interleaving of at least the parity symbols so that related parity symbols and information symbols are mutually separated modulation symbols; the subset being defined by selecting the locations that are mapped to positions in the modulation symbols., the system obtained by modifying Walton et al. based on Tong et al. Dötsch et al. and Farrell et al, discloses the above limitations. See that interleaving is applied to information and parity symbols (Fig. 5 of Tong et al.) and the modulator such as the one taught by Farrell e. al., creates modulation symbols using information and parity pairs (Table 1 on column 3) with related parity symbols and information symbols distributed over mutually separated modulation symbols (see Table 1 of Farrell where information/parity (d1p1 & d2q2) are paired to create constellation points which are mutually spaced apart (distributed over mutually separated modulation symbols or constellation points)). Finally with respect to the subset being defined by selecting the locations that are mapped to positions in the modulation symbols, the subset referring to the subset of parity symbols (since the generated parity symbols are punctured, therefore a subset remains after puncturing) see column 8, lines 8-10 of Tong et al., where the punctured symbols are supplied to a buffer, and it is understood that the modulator accesses (selects) the buffer locations to generate the modulation symbols.

Claim 5 is rejected based on a rationale similar to the one used to reject claim 2 above.

Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe (U.S. 6,272,123) in view of Shiu et al. (U.S. 6,798,826).

With respect to claim 6, Abe et al. discloses: for demodulating information from a transmission signal (Fig. 2, demodulation and despreading takes place in "RF receiving stage 52" , column 5, lines 13-16, column 6, lines 55-58); a control unit for dynamically indicating a coding rate that has been used for encoding the transmission signal, the encoding ate being dependent on a level of protection against errors (Fig. 2, block 40 is a controller and information on line 63 (the line connected to blocks 57-58 dynamically indicates a coding rate that has been used for encoding the transmission signal, see column 8, lines 34-37 where the dynamic selection of error correcting decoder 57 or 58 by controller 40 corresponds to dynamically indicating a coding rate used at the transmitter since these decoders undo the encoding operation performed by error correcting encoders 42, 44 which have different encoding rates and one of them is selected to encode the transmission of data at a time, column 7, lines 18-23, 40-45, column 8, lines 20-26, 37-41, 47-53 with respect to the coding rate being dependent on a level of protection against errors, notice the difference encoding rates: 1/2 or 1/3 , column 6, lines 29-35 the 1/3 code adds more redundant bits than the 1/2 rate, the code with code which adds more redundant bits per information bit protects more against errors);a de-interleaver (Fig. 2, block 55); an error correction unit for correcting

errors in the demodulated information (Fig. 2 selection of one of the error correcting decoders by controller 40, column 8, lines 38-41), the error correction unit being arranged to read the demodulated information from the de-interleaver in de-interleaved terms (column 8, lines 30-38, the error correction unit receives (and reads so that it can perform decoding) demodulated information (demodulation is a function of the RF receiving stage 21, column 5, lines 13-15) in de-interleaved (and punctured terms)).

Abe does not expressly disclose: the de-interleaver comprising a memory, writing the demodulated information into the memory according to a coding rate independent address scheme, skipping locations for parity bits that a control unit indicates to have been suppressed by puncturing.

In the same field of endeavor, Shiu et al. disclose:; a de-interleaver comprising a memory (Fig. 8 buffer 822, (Fig. 8 comprises blocks 822, 824, column 16, lines 14-18), the de-interleaver writing the demodulated information into the memory according to a coding rate independent address scheme (column 17, table erasure insertion algorithm, is coding rate independent , skipping locations for parity bits that a control unit indicates to have been suppressed by puncturing (column 17, lines 13-50, where writing erasures in the memory in the place of punctured bits is equivalent to skipping locations for punctured parity bits, column 17, lines 15-45 shows that the erasure insertion algorithm is code rate independent and Fig. 11 shows blocks controller 1130 and address generator 1130 implementing the de-interleaving process, column21, lines 64-67, column 22, lines 1-3);

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system of Abe based on Shiu et al. to use a deinterleaver comprising a buffer (memory) whose content is populated using an algorithm (a series of instructions) and skip locations that were punctured so that the bit de-puncturer inserts the punctured bits in those locations (column 17, lines 11-35).

Claim 7 is rejected based on a rationale similar to the one used to reject apparatus claim 6 above.

Conclusion

6 Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is (571)272-5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SOPHIA VLAHOS/

Examiner, Art Unit 2611
7/20/2009
/Mohammad H Ghayour/
Supervisory Patent Examiner, Art Unit 2611